EPA/AMD/R04-90/060
1990

EPA Superfund
Record of Decision Amendment:

HIPPS ROAD LANDFILL
EPA ID: FLD980709802
OU 01
DUVAL COUNTY, FL
09/21/1990

- PROPER LANDFILL CLOSURE;

- IMPLEMENTATION OF INSTITUTIONAL CONTROLS INCLUDING FENCING THE SITE, GROUTING EXISTING PRIVATE WELLS, INSTITUTING A WELL DRILLING BAN FOR A MINIMUM OF 20 YEARS, AND ACQUIRING AFFECTED PROPERTIES;

- RECOVERY OF CONTAMINATED GROUND WATER WITH TREATMENT AT THE LOCAL PUBLICLY OWNED TREATMENT WORKS (POTW);

- CONTINUED MONITORING OF THE GROUND WATER FOR 20 YEARS FOLLOWING THE FINAL GROUNDWATER RECOVERY PHASE;

- OPERATION AND MAINTENANCE (O & M) ACTIVITIES INCLUDING OPERATING AND MAINTAINING THE GROUNDWATER RECOVERY SYSTEM, GROUNDWATER MONITORING, MAINTAINING THE LANDFILL CAP AND ASSOCIATED SYSTEM, MAINTAINING THE CONNECTOR SEWER LINES WHICH ACCESS MAINS TO THE POTW, AND MAINTAINING THE SITE SECURITY SYSTEMS.

AFTER THE ROD WAS SIGNED ON SEPTEMBER 3, 1986, EPA NEGOTIATED A PARTIAL CONSENT DECREE WITH WASTECONTROL OF FLORIDA, INC., ONE OF TWO POTENTIALLY RESPONSIBLE PARTIES (PRPS) FOR THE SITE. THE PARTIAL CONSENT DECREE WAS ENTERED BY THE COURT ON JANUARY 25, 1989. UNDER THE CONSENT DECREE, WASTECONTROL OF FLORIDA, INC., AGREED TO DESIGN THE LANDFILL COVER AND THE GROUNDWATER RECOVERY SYSTEM, AND TO DEVELOP THE INSTITUTIONAL CONTROLS. WASTECONTROL ALSO AGREED IN THE CONSENT DECREE TO IMPLEMENT THE LANDFILL CLOSURE AND INSTITUTIONAL CONTROLS. ALTHOUGH WASTECONTROL HAD AGREED TO DESIGN THE GROUNDWATER RECOVERY SYSTEM, WASTECONTROL DID NOT AGREE TO CONSTRUCT AND OPERATE THE GROUNDWATER RECOVERY SYSTEM. THE LANDFILL CLOSURE DESIGN WAS COMPLETED AND APPROVED ON MAY 22, 1989.

PREVIOUS RECORDS OF THE SITE INDICATE THAT IN 1970 THE LANDFILL WAS COVERED WITH SOIL AND FIVE HOMES WERE CONSTRUCTED ON THE PROPERTY. AS STIPULATED IN THE CONSENT DECREE, WASTECONTROL ACQUIRED THESE (5) HOMES AND REMOVED THEM FROM THE SITE IN THE SPRING AND SUMMER OF 1988.

CONSTRUCTION OF THE LANDFILL COVER BEGAN IN OCTOBER 1989. A CLAY CAP SYSTEM WAS PLACED OVER THE LANDFILL TO REDUCE INFILTRATION AND MINIMIZE CONTAMINANT MIGRATION. AN EIGHT-FOOT SECURITY FENCE WAS INSTALLED AROUND THE SITE. A PERIMETER DITCH WAS CONSTRUCTED TO CARRY RUNOFF FROM THE COVER TO A LARGE RETENTION BASIN SOUTHEAST OF THE ACTUAL LANDFILL AREA BUT WITHIN THE FENCED AREA. THE BASIN WAS DESIGNED TO RETAIN THE 100 YEAR STORM EVENT ENTIRELY ON-SITE. PRIOR TO CONSTRUCTION OF THE CLAY LANDFILL COVER, TREES AND LARGE VEGETATION WERE CLOSE-CUT AND REMOVED FROM THE SITE. TO PREVENT EROSION OF THE CLAY COVER, A VEGETATIVE SOIL COVER WAS PLACED OVER THE CLAY. ELEVEN (11) ADDITIONAL MONITORING WELLS WERE ALSO INSTALLED. CONSTRUCTION OF THE LANDFILL WAS COMPLETED IN APRIL, 1990.

THE INITIAL GROUNDWATER RECOVERY SYSTEM DESIGN REPORT (30 PERCENT COMPLETION) WAS SUBMITTED TO THE AGENCY IN APRIL, 1989. THE DESIGN OF THE GROUNDWATER RECOVERY SYSTEM IS BASED PRIMARILY ON THE INFORMATION GATHERED DURING THE REMEDIAL DESIGN. DATA COLLECTED FROM EXISTING WELLS AND NEW TEMPORARY MONITORING WELLS CONSTRUCTED DURING THE REMEDIAL DESIGN (RD) PHASE OF THE PROJECT WERE USED FOR PREDICTING THE AREA OF OFF-SITE GROUNDWATER CONTAMINATION. DATA GENERATED DURING THE RI/FS WAS USED TO SUPPLEMENT THE RD INFORMATION. THE GROUNDWATER RECOVERY DESIGN AND ADDITIONAL GROUNDWATER DATA COLLECTION ARE DESCRIBED IN SECTION 7.0, SELECTED REMEDY, OF THIS DOCUMENT. BASED ON THE ADDITIONAL TECHNICAL INFORMATION AND CHANGING RATE STRUCTURE OF THE POTW (OR ESCALATING COSTS ASSOCIATED WITH THE POTW), THE AGENCY DECIDED TO AMEND THE SEPTEMBER 1986 ROD.

EXPLANATION OF FUNDAMENTAL REMEDY CHANGE

THE SEPTEMBER 1986 ROD SPECIFIED RECOVERY OF CONTAMINATED GROUNDWATER WITH DISPOSAL AT THE LOCAL POTW AND THAT RECOVERY WOULD CONTINUE UNTIL THE GROUNDWATER WAS IN COMPLIANCE WITH THE STANDARDS ESTABLISHED IN THE SAFE DRINKING WATER ACT (SDWA).

CONTAMINANTS NOT ADDRESSED UNDER SDWA WOULD BE REMOVED UNTIL COMPLIANCE WITH THE 1980 WATER QUALITY CRITERIA HUMAN HEALTH STANDARDS WAS REACHED. ACCORDING TO THE ROD, WHERE NO STANDARDS EXISTED, A CONCENTRATION THAT WOULD RESULT IN NO MORE THAN THE RISK OF ONE ADDITIONAL CANCER IN A LIFETIME FOR AN EXPOSED POPULATION OF ONE MILLION WOULD BE USED AS THE CLEANUP TARGET. THIS HAS NOT CHANGED. THE ROD ALSO SPECIFIED CONTINUED MONITORING FOR TWENTY (20) YEARS AFTER THE STANDARDS ARE MET AND THAT THE SYSTEM WOULD BE REACTIVATED IF GROUNDWATER CONTAMINANTS ARE DETECTED ABOVE TARGET CLEAN-UP VALUES.

HOWEVER, NEW INFORMATION HAS BEEN DEVELOPED SINCE ISSUANCE OF THE ROD IN 1986. THE QUALITY OF THE CONTAMINATED GROUND WATER IS NOW UNDERSTOOD TO BE MUCH BETTER THAN PREVIOUSLY DESCRIBED IN THE RI/FS REPORTS. IN ADDITION, THE AREA CONTAINING THE CONTAMINATED GROUND WATER IS SMALLER THAN ORIGINALLY THOUGHT. EXTENSIVE SAMPLING HAS MORE PRECISELY DEFINED THE LOCATION OF THE CONTAMINATION. THE CONTAMINANTS THAT ARE CURRENTLY FOUND IN THE AQUIFER CAN BE EFFECTIVELY REMOVED BY THE PROCESS OF AIR STRIPPING. ALSO, BASED ON THE CURRENT POTW RATE STRUCTURE, THE COST FOR DISPOSAL OF THE CONTAMINATED WATER AT THE POTW WILL BE SUBSTANTIALLY HIGHER THAN ESTIMATED IN THE FS. IN SUMMARY, THE CONTAMINANTS CURRENTLY AT LEVELS OF CONCERN AT THE SITE ARE AMENABLE TO AIR STRIPPING AND THE RELATIVE COSTS OF AIR STRIPPING AND POTW TREATMENT HAVE CHANGED. FOR THESE REASONS, THE SELECTED ALTERNATIVE FOR GROUNDWATER REMEDIATION AT THE HIPPS ROAD LANDFILL WILL BE MODIFIED TO INCLUDE AIR STRIPPING, AND DISPOSAL ON-SITE INSTEAD OF AT THE POTW.

ENFORCEMENT ANALYSIS

EPA AND WASTECONTROL OF FLORIDA, INC., SIGNED A PARTIAL CONSENT DECREE WHICH WAS ENTERED BY THE US DISTRICT COURT ON JANUARY 25, 1989. THE OTHER RESPONSIBLE PARTY, THE UNITED STATES NAVY, DID NOT SIGN THE CONSENT DECREE BUT DID ENTER INTO A SEPARATE AGREEMENT WITH WASTECONTROL WHEREBY THE NAVY AGREED TO CONTRIBUTE FUNDS TO THE COSTS OF THE REMEDIAL ACTION. UNDER THE PARTIAL CONSENT DECREE, WASTECONTROL AGREED TO DESIGN THE LANDFILL COVER AND THE GROUNDWATER RECOVERY AND TREATMENT SYSTEM, AND TO DEVELOP THE INSTITUTIONAL CONTROLS FOR THE SITE. HOWEVER, WASTECONTROL DID NOT AGREE TO CONSTRUCT AND OPERATE THE GROUNDWATER RECOVERY AND TREATMENT SYSTEM. AS OF THE DATE OF THIS AMENDED RECORD OF DECISION, THE LANDFILL COVER HAS BEEN DESIGNED AND CONSTRUCTED BY WASTECONTROL. SUBSEQUENT TO THE ENTRY OF THE PARTIAL CONSENT DECREE, EPA REEVALUATED THE GROUNDWATER REMEDY SELECTED IN THE RECORD OF DECISION AND DETERMINED THAT AN ALTERNATIVE REMEDY REQUIRING AIR STRIPPING WOULD BE MORE APPROPRIATE.

COMMUNITY RELATIONS

EPA PREPARED A RECORD OF DECISION (ROD) ON SEPTEMBER 3, 1986, TAKING INTO CONSIDERATION THE COMMENTS FROM THE PUBLIC AND THE RESULTS OF THE FS. THE MOST ENVIRONMENTALLY SOUND AND COST-EFFECTIVE REMEDY WAS THEN SELECTED AS A PART OF THE RECORD OF DECISION (ROD) PHASE OF THE SUPERFUND PROCESS. EPA SELECTED CAPPING OF THE LANDFILL, INSTITUTIONAL CONTROLS AND RECOVERY OF CONTAMINATED GROUND WATER AND DISCHARGE TO THE POTW.

IN SEPTEMBER, 1988, A FACT SHEET WAS PUBLISHED TO INFORM THE PUBLIC OF PLANNED REMEDIAL DESIGN ACTIVITIES. A PUBLIC MEETING WAS HELD ON APRIL 5, 1989 TO PRESENT A SCHEDULE FOR IMPLEMENTATION OF REMEDIAL DESIGN ACTIVITIES AT THE SITE. THE MEETING ALSO SERVED TO INFORM CITIZENS THAT THE COURT HAD ENTERED THE PARTIAL CONSENT DECREE AND HAD REQUIRED THAT EPA SUBMIT A REVISED COMMUNITY RELATIONS PLAN AND FILE AN ADMINISTRATIVE RECORD.

EPA CONDUCTED A PUBLIC INFORMATION MEETING ON AUGUST 15, 1989 TO PRESENT THE DESIGN FOR THE LANDFILL CLOSURE TO INTERESTED CITIZENS AND LOCAL OFFICIALS AND TO PROVIDE AN OPPORTUNITY FOR FURTHER DISCUSSION OF CONCERNS RAISED BY CITIZENS DURING THE PREVIOUS APRIL 5, 1989 MEETING. (SUMMARY OF PUBLIC COMMENT AND AGENCY RESPONSE, HIPPS ROAD LANDFILL SITE SUPERFUND FACT SHEET, AUGUST 1989.) EPA CONDUCTED A MORE RECENT PUBLIC MEETING ON JULY 11, 1990. AT THE MEETING, EPA, IN CONSULTATION WITH FDER, ANNOUNCED TO CITIZENS THAT THE AGENCY WAS CONSIDERING MODIFYING THE PROPOSED ALTERNATIVE FOR GROUNDWATER RECOVERY BASED ON NEW INFORMATION AFFECTING THE COST EFFECTIVENESS OF TWO ALTERNATIVES. A 30 DAY PUBLIC COMMENT PERIOD WAS INITIATED AND WAS EXTENDED FOR 30 DAYS AT THE REQUEST OF LOCAL CITIZENS. THE COMMENT PERIOD ENDED ON AUGUST 31, 1990. A SUMMARY OF THE COMMENTS RECEIVED AND THE AGENCY'S RESPONSE IS INCLUDED AS APPENDIX B.

CURRENT SITE STATUS

ON-SITE SOILS

AS STATED PREVIOUSLY, THE LANDFILL CLOSURE SYSTEM IS COMPLETED. TO ADDRESS THE CONCERN THAT PLACEMENT OF A LOW PERMEABILITY SOIL COVER OVER THE LANDFILL MIGHT CAUSE THE METHANE TYPICALLY GENERATED IN LANDFILLS TO MIGRATE LATERALLY, A METHANE MONITORING SYSTEM WAS PLACED AROUND THE PERIMETER OF THE LANDFILL.

METHANE GAS SURVEYS WERE CONDUCTED IN DECEMBER 1988 AND APRIL 1989. DURING THE EARLIER SURVEY (DECEMBER 1988) MEASUREMENTS OF GAS CONCENTRATIONS WERE MADE AT 13 LOCATIONS EVENLY DISTRIBUTED AROUND THE LANDFILL BOUNDARY. NO METHANE WAS DETECTED AT ANY OF THE LOCATIONS TESTED INDICATING THAT METHANE WAS NOT MIGRATING LATERALLY FROM THE LANDFILL AT THAT TIME. HOWEVER, THE RESULTS OF THE APRIL 1989 GAS SURVEY INDICATED THAT, OF THE SIX LOCATIONS SURVEYED WITHIN THE BOUNDARIES OF THE LANDFILL, METHANE GAS WAS DETECTED IN FIVE BORINGS.

OF THE FIVE DETECTIONS, METHANE WAS DETECTED AT CONCENTRATIONS ABOVE THE LOWER EXPLOSIVE LIMIT, OR LEL (5 PERCENT METHANE BY VOLUME IN AIR) IN TWO OF THE BOREHOLES. THIS SHOWS THAT, WHILE METHANE IS BEING PRODUCED WITHIN THE LANDFILL, IT IS NOT MIGRATING OFF SITE.

DETAILED RESULTS OF BOTH THE DECEMBER 1988 AND APRIL 1989 INVESTIGATIONS ARE INCLUDED IN APPENDIX A OF THE LANDFILL CLOSURE DESIGN. THE LOCATIONS TESTED IN EACH SURVEY ARE SHOWN IN FIGURE 1.

SINCE COMPLETION OF THE CLAY LANDFILL CAP, ADJACENT RETENTION BASIN, PERIMETER DITCHES, AND ACCOMPANYING VEGETATION COVER, FURTHER MIGRATION OF CONTAMINANTS VIA PERCOLATION INTO THE GROUND WATER, LATERAL MIGRATION OF THE GROUND WATER THROUGH THE SOILS, OR STORM WATER RUNOFF FROM THE SURFACE SOILS IS CONTROLLED.

HYDROGEOLOGY

GROUNDWATER CONTAMINANTS

THE CURRENT AREAL AND VERTICAL EXTENT OF GROUNDWATER CONTAMINATION WAS DELINEATED FROM TWO SOURCES OF INFORMATION. ONE SOURCE WAS A NEW TEMPORARY MONITORING WELL SYSTEM (TMW-SERIES WELLS) INSTALLED FOR THE REMEDIAL DESIGN INVESTIGATION. THE OTHER SOURCE WAS DATA OBTAINED BY RESAMPLING THE MW-SERIES WELLS WHICH WERE INSTALLED AND SAMPLED AS PART OF THE RI. BECAUSE THE PRIMARY PURPOSE OF THE TMW-SERIES WAS TO DEFINE CURRENT GROUNDWATER CONTAMINANT PLUME BOUNDARIES, THESE WELLS WERE INSTALLED FARTHER DOWNGRADIENT FROM THE SITE THAN THE MW-SERIES WELL SYSTEM.

THE TMW-SERIES WELLS CONSIST OF ELEVEN (11) MONITORING WELL CLUSTERS. EACH CLUSTER IS COMPRISED OF THREE (3) WELLS INSTALLED IN SEPARATE BOREHOLES: A SHALLOW WELL (35 FEET), AN INTERMEDIATE WELL (65 FEET), AND A DEEP WELL (95 FEET). SAMPLING AND ANALYSIS OF THE MW-SERIES WELLS AND THE TMW-SERIES WELLS INDICATE THE FOLLOWING.

THREE DETECTIONS OF METALS WERE ABOVE MCLS:

	MAXIMUM LEVEL DETECTED	MAXIMUM CONTAMINANT LEVEL (MCL) (FEDERAL/STATE)
CHROMIUM - MW-21 (CLUSTER G)	- 0.056 MG/L	0.05 MG/L
CHROMIUM - TMW-2D (DEEP)	- 0.074 MG/L	0.05 MG/L
LEAD - MW-9 (CLUSTER D)	- 0.068 MG/L	0.05 MG/L

FOUR DETECTIONS OF ORGANIC COMPOUNDS WERE ABOVE MCLS:

VINYL CHLORIDE - TMW-7I	-	20.0 UG/L	1.0 UG/L
BENZENE - TMW-7I	-	7.9 UG/L	5.0/1.0 UG/L
BENZENE - TMW-3I	-	7.9 UG/L	5.0/1.0 UG/L
VINYL CHLORIDE - TMW-8I	-	1.3 UG/L	1.0 UG/L

BASED ON THE ABOVE DATA, THE ZONE OF OFF-SITE GROUNDWATER CONTAMINATION IS CONFINED TO THE LOWER PORTION OF THE SAND AQUIFER. THE BOUNDARY OF THE CONTAMINATION PLUME IS DEFINED BY THOSE WELLS WHICH DID NOT HAVE CHEMICALS DETECTED ABOVE THE MAXIMUM CONTAMINANT LEVEL (MCL) AND NON-ZERO MCLGS. THE ZONE IS BOUNDED ON THE NORTHWEST SIDE BY WELLS TMW-11I AND TMW-10I, ON THE SOUTHEAST BY WELLS TMW-4I AND MW-9 (CLUSTER MW-D), ON THE NORTHEAST BY A NORTHWEST/SOUTHEAST TRENDING LINE APPROXIMATELY 16 FEET DOWN-GRADIENT (NORTHEAST) OF WELL TMW-8I, AND ON THE SOUTHWEST BY TMW-6I. WITH THE EXCEPTION OF TMW-8I, THESE WELLS BOUNDING THE ZONE OF OFF-SITE GROUNDWATER CONTAMINATION DID NOT HAVE ORGANIC CONTAMINANTS DETECTED ABOVE MCLS.

THE BOUNDARY OF POTENTIAL OFF-SITE GROUNDWATER CONTAMINATION IS DEPICTED IN FIGURE 2. THE ANALYTICAL RESULTS OF SAMPLING BOTH THE MW-SERIES AND TMW-SERIES WELLS ARE CONTAINED IN APPENDIX F OF THE DRAFT GROUNDWATER RECOVERY SYSTEM DESIGN REPORT.

THE ISOLATED CHROMIUM DETECTION OF 76 UG/L IS ABOVE THE MAXIMUM CONTAMINANT LEVEL OF 50 UG/L. HOWEVER, THE CHROMIUM LEVEL DETECTED IS BELOW THE CURRENT PROPOSED MAXIMUM CONTAMINANT LEVEL(MCLG) OF 100 UG/L AND IS, THEREFORE, CONSIDERED PROTECTIVE OF HUMAN HEALTH.

TO ADDRESS THE CONCERN THAT LEAD MIGHT BE SITE RELATED, A STATISTICAL ANALYSIS OF LEAD CONTAMINATION WAS DONE TO DETERMINE IF A SIGNIFICANT DIFFERENCE EXISTED BETWEEN THE UPGRADIENT AND DOWNGRADIENT LEAD CONCENTRATIONS. FOUR SETS OF DATA (RESULTS FROM FOUR SEPARATE SAMPLING EVENTS SPANNING A FIVE YEAR PERIOD) WERE ANALYZED BY THIS METHOD. BECAUSE THE ANALYSIS DEMONSTRATED A LACK OF SIGNIFICANT DIFFERENCE IN THE LEAD CONCENTRATIONS, THE LEAD FOUND IN THE GROUND WATER IS NOT CONSIDERED SITE-RELATED AND WILL NOT BE THE TARGET OF GROUNDWATER RECOVERY. HOWEVER, LEAD CONCENTRATIONS IN RECOVERED GROUND WATER WILL BE REDUCED TO MCLS BEFORE THE GROUNDWATER IS DISCHARGED TO THE RETENTION BASIN.

FINALLY, TO PREDICT THE EXTENT AND CONCENTRATION OF VINYL CHLORIDE BEYOND (DOWN-GRADIENT OF) TMW-8I, A GROUNDWATER MODEL WAS USED. THE MODEL RESULTS (APPENDIX G, DRAFT GROUNDWATER RECOVERY SYSTEM DESIGN) PREDICT ONLY MINIMAL MOVEMENT (16 FEET) OF THE PLUME DOWN-GRADIENT OF TMW-8I AT THIS TIME, WELL WITHIN THE CAPTURE ZONE OF THE RECOVERY WELLS.

#SSR
SUMMARY OF SITE RISKS

PUBLIC HEALTH AND ENVIRONMENTAL OBJECTIVES

AT THE TIME THE ROD WAS SIGNED IN SEPTEMBER 1986, THE CURRENT PUBLIC HEALTH THREAT WAS THROUGH PHYSICAL CONTACT WITH THE FILL MATERIAL. THIS EXPOSURE PATHWAY HAS BEEN ELIMINATED BY IMPLEMENTATION OF THE LANDFILL CLOSURE. RECOVERY OF THE CONTAMINATED GROUND WATER IS THE REMAINING REMEDIAL OBJECTIVE.

THE CONTAMINATED GROUND WATER IN THE SAND AQUIFER IS NOT CURRENTLY BEING CONSUMED BY RESIDENTS IN THE VICINITY OF THE SITE. ALL RESIDENTS NEAR THE PLUME HAVE ACCESS TO MUNICIPAL WATER. IN ADDITION, THE CITY OF JACKSONVILLE HAS ENVIRONMENTAL HEALTH REGULATIONS WHICH PROHIBIT DRINKING WATER WELLS WITHIN THE CONTAMINATED AREA. ALTHOUGH THE SAND AQUIFER DOES NOT POSE A CURRENT RISK TO AREA RESIDENTS, IT IS CLASSIFIED UNDER THE GROUNDWATER PROTECTION STRATEGY AS A POTENTIAL SOURCE OF DRINKING WATER OR A CLASS IIB AQUIFER. A POTENTIAL SOURCE OF DRINKING WATER IS ONE WHICH IS NOT CURRENTLY BEING USED AS A DRINKING WATER SOURCE BUT IS CAPABLE OF YIELDING A QUANTITY OF WATER THAT SATISFIES THE NEEDS OF THE AVERAGE FAMILY AND HAS A TOTAL DISSOLVED SOLIDS CONCENTRATION OF LESS THAN 10,000 MG/L.

CLASS IIB AQUIFERS MUST BE REMEDIATED TO DRINKING WATER STANDARDS, IF AVAILABLE, OR TO HEALTH BASED LEVELS IF STANDARDS ARE NOT AVAILABLE. THIS HAS THE CORRESPONDING EFFECT OF PLACING THE RISK WITHIN THE (10-4) TO (10-6) RANGE WHICH IS THE OVERALL GOAL OF SUPERFUND REMEDIES. RECENT SAMPLING DATA INDICATE THAT SEVERAL CONTAMINANTS IN THE LEADING EDGE OF THE PLUME EXCEED DRINKING WATER STANDARDS. IN ADDITION TO BEING CLASSIFIED AS A IIB AQUIFER, THE PLUME IS MIGRATING TOWARD THE ORTEGA RIVER WHERE IT COULD ALSO HAVE AN ENVIRONMENTAL IMPACT. GROUNDWATER REMEDIATION GOALS ARE PRESENTED IN TABLE 1.

ALTERNATIVES CONSIDERED FOR GROUNDWATER REMEDIATION IN SEPTEMBER 1986 ROD

REMEDIAL ALTERNATIVES CONSIDERED FOR THE HIPPS ROAD LANDFILL ARE LISTED BELOW:

A. GROUNDWATER TECHNOLOGIES

1. EXTRACTION, AIR STRIPPING AND DISPOSAL ON-SITE
2. EXTRACTION, FLOCCULATION, SEDIMENTATION, FILTRATION, AND DISPOSAL (*)
3. EXTRACTION, AND TREATMENT AT THE POTW
4. EXTRACTION, AIR STRIPPING, FLOCCULATION, SEDIMENTATION, FILTRATION, CARBON ADSORPTION, AND DISPOSAL (*)
5. EXTRACTION OF GROUND WATER FROM HYDRAULIC BARRIER WELLS ON-SITE, LONG TERM AIR STRIPPING, AND DISPOSAL TO THE ORTEGA RIVER(*)
6. EXTRACTION OF GROUND WATER FROM HYDRAULIC BARRIER WELLS, TREATMENT ACCORDING TO A-4, AND DISCHARGE TO THE POTW(*)
7. INSTALLATION OF A HANGING SLURRY WALL AROUND THE LANDFILL, SURFACE CAPPING, REVERSE GRADIENT WELLS WITHIN THE SLURRY WALL(*)

ALTERNATIVES SCREENING

THE ALTERNATIVES AND TECHNOLOGIES IDENTIFIED WITH A (*) ABOVE WERE SCREENED OUT IN THE JANUARY 1986 ROD. THE REASONS WHY CERTAIN ALTERNATIVES AND TECHNOLOGIES WERE SCREENED OUT AT THAT TIME IS PRESENTED IN TABLE 2.

ALTERNATIVE PREVIOUSLY SELECTED FOR GROUND WATER

THE SELECTED REMEDY FOR GROUND WATER, AS SPECIFIED IN THE 1986 ROD, WAS ALTERNATIVE A3 - EXTRACTION AND TREATMENT AT THE POTW. THE SELECTION OF THIS ALTERNATIVE IS NOW BEING REEVALUATED AS A RESULT OF ADDITIONAL INFORMATION ABOUT THE NATURE AND EXTENT OF CONTAMINATION AT THE SITE AND CHANGES IN THE RELATIVE COSTS OF VARIOUS REMEDIES SINCE THE ROD WAS SIGNED IN 1986.

DESCRIPTION OF ALTERNATIVES CURRENTLY BEING CONSIDERED FOR GROUNDWATER REMEDIATION

ALTERNATIVE 1 EXTRACTION, AIR STRIPPING, AND DISPOSAL ON-SITE

ALTERNATIVE 3 EXTRACTION AND TREATMENT AT THE PUBLICLY OWNED TREATMENT WORKS

ALTERNATIVE 1 - EXTRACTION, AIR STRIPPING AND DISPOSAL ON-SITE

THIS ALTERNATIVE INVOLVES IMPLEMENTATION OF A GROUNDWATER RECOVERY SYSTEM DESIGNED TO RECOVER THE EXISTING PLUME OF CONTAMINANTS. THE CONTAMINATED GROUND WATER WILL BE PASSED THROUGH A COUNTER CURRENT AIR COLUMN WHICH WILL ENHANCE THE EXCHANGE OF ORGANICS FROM THE AQUEOUS STREAM TO THE EFFLUENT AIR STREAM. A HIGH DEGREE OF WATER DETOXIFICATION IS POSSIBLE. THE CLEAN WATER WOULD BE DISCHARGED TO THE ON-SITE STORMWATER RETENTION BASIN FOR DISPOSAL. THIS ALTERNATIVE IS NOT EXPECTED TO EMIT ORGANIC VAPORS IN LEVELS WHICH WOULD CAUSE ENVIRONMENTAL OR PUBLIC HEALTH CONCERNS DUE TO LOW CONTAMINANT LEVELS AND RAPID DISPERSION. HOWEVER, SITE SPECIFIC TESTING DURING RD AND RA WOULD BE REQUIRED.

ALTERNATIVE 3 - EXTRACTION AND TREATMENT AT THE PUBLICLY OWNED TREATMENT WORKS

EXTRACTION OF THE GROUND WATER WOULD BE IMPLEMENTED WITH A SYSTEM DESIGNED TO RECOVER THE EXISTING PLUME OF GROUNDWATER CONTAMINANTS. THE UNTREATED GROUND WATER WOULD BE DISCHARGED TO NEARBY MUNICIPAL SEWER LINES FOR TREATMENT AT THE LOCAL POTW. DISPOSAL TO THE POTW IS NOT EXPECTED TO HAVE A SIGNIFICANT EFFECT ON THE LEVEL OF VOLATILE ORGANIC COMPOUNDS IN THE TREATMENT PLANT EFFLUENT, DUE TO DILUTION AT THE POTW HEAD WORKS. ALSO, THE CONCENTRATION OF VOLATILE ORGANIC COMPOUNDS WOULD DIMINISH DURING TRANSPORT TO THE TREATMENT PLANT AS A RESULT OF AERATION. THE LEVEL OF GROUNDWATER CONTAMINATION IS SUFFICIENTLY LOW TO ALLOW THE POTW TO ACCEPT THE WASTES WITHOUT VIOLATION OF THE OPERATIONAL PERMITS. THE FLOW RATE WILL NOT ADD SIGNIFICANT HYDRAULIC LOADING AT THE POTW.

COMPARATIVE ANALYSIS

THIS ANALYSIS WILL COMPARE THE ALTERNATIVES, A-1 AND A-3, FOR THE NINE EVALUATION CRITERIA DETAILED IN THE NATIONAL CONTINGENCY PLAN (NCP).

- OVERALL PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT - BOTH OF THE ALTERNATIVES ACCOMPLISH THIS CRITERION. BOTH OF THE ALTERNATIVES ARE WITHIN AGENCY GUIDELINES AND WOULD PROVIDE ADEQUATE PROTECTION BY REDUCING OR CONTROLLING THE THREAT TO THE ENVIRONMENT BY REMEDIATING THE CONTAMINATED GROUND WATER.

- COMPLIANCE WITH ARARS - BOTH ALTERNATIVES WOULD MEET THE RESPECTIVE ARARS AND CLEANUP GOALS. NO WAIVER FROM ARARS WOULD BE NECESSARY TO IMPLEMENT EITHER CLEANUP ALTERNATIVE.

- LONG-TERM EFFECTIVENESS AND PERFORMANCE - GROUNDWATER TREATMENT AND RECOVERY WOULD PROVIDE A PERMANENT REMEDY; THEREFORE, EITHER ALTERNATIVE WOULD MEET THIS CRITERIA AND REDUCE THE RISK ASSOCIATED WITH GROUND WATER AT THIS SITE.

- REDUCTION OF TOXICITY, MOBILITY, AND VOLUME - BOTH ALTERNATIVES WOULD REDUCE THE TOXICITY, MOBILITY AND VOLUME OF GROUNDWATER CONTAMINATION BY DECREASING THE SIZE OF THE CONTAMINANT PLUME AND THE THREAT OF FURTHER DEGRADATION OF THE GROUND WATER.

- SHORT-TERM EFFECTIVENESS - BOTH OPTIONS PROVIDE SIMILAR SHORT-TERM EFFECTIVENESS SINCE THE ONLY DIFFERENCE IS IN OFF-SITE OR ON-SITE TREATMENT. THE REMEDIAL DESIGN INDICATES THAT EMISSIONS FROM THE SYSTEM WILL BE MUCH LOWER THAN FLORIDA STANDARDS AND NEITHER WOULD POSE SIGNIFICANT HEALTH RISKS TO NEARBY RESIDENTS OR SEWAGE TREATMENT PLANT WORKERS. IN ORDER TO BETTER DEFINE AIR IMPACTS ASSOCIATED WITH OPERATION OF THE GROUNDWATER RECOVERY AND TREATMENT SYSTEM, A MORE DETAILED ANALYSIS OF THE SYSTEM WAS CONDUCTED AND IS DETAILED IN SECTIONS 7.0 AND 7.1, SELECTED REMEDY AND DESIGN OF SELECTED REMEDY, RESPECTIVELY.

- IMPLEMENTABILITY - BOTH ALTERNATIVES ARE TECHNICALLY FEASIBLE USING TECHNOLOGIES THAT HAVE DEMONSTRATED PERFORMANCE RECORDS. ALTHOUGH THE POTW FACILITY ALREADY EXISTS, A TRANSFER PIPELINE WOULD HAVE TO BE BUILT AND THE EXISTING SEWER LINE ENLARGED. THE ON-SITE FACILITY DOES NOT NOW EXIST. THE TWO ALTERNATIVES APPEAR TO BE TECHNICALLY EQUAL FOR THIS CRITERION. HOWEVER, THE CITY OF JACKSONVILLE HAS EXPRESSED CONCERNS REGARDING RATHER OR NOT THE CITY WOULD BE ASSUMING LIABILITY BY ACCEPTING DISCHARGE FROM THE HIPPS ROAD LANDFILL. IN ADDITION, CITY OFFICIALS WERE CONCERNED THAT THE TREATMENT PLANT (POTW) MIGHT VIOLATE ITS NPDES PERMIT. THEREFORE, THE AIR STRIPPING TREATMENT AND DISPOSAL ON-SITE IS ADMINISTRATIVELY MORE FEASIBLE THAN TREATMENT AND DISPOSAL AT THE POTW.

- COST - BECAUSE OF ESCALATING POTW COSTS, THE REMEDY SELECTED IN THE ROD COULD NOW COST $3.9 TO $4.4 MILLION. THE ON-SITE TREATMENT OPTION IS CURRENTLY ESTIMATED AT $1.2 MILLION (FEBRUARY, 1990) AND IS, THEREFORE, THE LESS EXPENSIVE ALTERNATIVE.

- STATE ACCEPTANCE - THE STATE OF FLORIDA CONCURS WITH THE ON-SITE TREATMENT ALTERNATIVE.

- COMMUNITY ACCEPTANCE - SOME MEMBERS OF THE COMMUNITY HAVE BEEN QUITE VOCAL IN CRITICIZING THE ON-SITE AIR STRIPPING REMEDY. THEY CITE A HISTORY OF EXPOSURE TO CONTAMINANTS FROM THE LANDFILL AND OF GOVERNMENTAL INACTION. MANY OF THE CITIZENS AT THE PUBLIC MEETING WERE WILLING TO ACCEPT ON-SITE AIR STRIPPING, BUT THEY ASKED THAT OFF-GAS CONTROL BE EVALUATED. IN RESPONSE TO THESE CONCERNS, THE AGENCY CONDUCTED SCREENING AIR MODELING FOR THE CONTAMINANTS OF CONCERN. THE RESULTS PREDICT EXPOSURE WELL BELOW EVEN VERY CONSERVATIVE CRITERIA (SEE P. 18 OF THIS DOCUMENT). ANOTHER CONDITION FOR CITIZEN ACCEPTANCE CONCERNED A COST ANALYSIS FOR A FILTRATION SYSTEM TO ELIMINATE EMITTING ANY CONTAMINANTS INTO THE AIR. USING ACTIVATED CARBON TO CONTROL VERY LOW LEVELS OF VINYL CHLORIDE IS PROBLEMATIC. THERE IS NOT MUCH EXPERIENCE IN USING IT FOR SUCH LOW LEVELS AND ITS PERFORMANCE IS QUESTIONABLE. THERE IS A BROAD RANGE OF UNCERTAINTY AS TO THE SIZE OF THE SYSTEM REQUIRED. ESTIMATES OBTAINED FROM VARIOUS VENDORS IN AUGUST, 1990 RANGED FROM $40,000.00 TO $250,000.00. THE AGENCY BELIEVES THAT THE REMEDY IS PROTECTIVE AS DESCRIBED.

#SR
SELECTED REMEDY

BASED UPON CONSIDERATION OF THE REQUIREMENTS OF CERCLA, THE DETAILED ANALYSIS OF BOTH ALTERNATIVES, AND PUBLIC COMMENTS, EPA HAS DETERMINED THAT ALTERNATIVE 1 IS THE MOST APPROPRIATE REMEDY FOR THE CONTAMINATED GROUND WATER AT THE HIPPS ROAD LANDFILL SITE IN JACKSONVILLE, FLORIDA.

THE SELECTED REMEDY INCLUDES IMPLEMENTATION OF A GROUNDWATER RECOVERY SYSTEM DESIGNED TO RECOVER THE EXISTING PLUME OF CONTAMINANTS. THE CONTAMINATED GROUND WATER WILL BE PASSED THROUGH A COUNTER CURRENT AIR COLUMN WHICH WILL ENHANCE THE EXCHANGE OF ORGANICS FROM THE AQUEOUS STREAM TO THE EFFLUENT AIR STREAM. A HIGH DEGREE OF WATER DETOXIFICATION IS POSSIBLE. THE CLEAN WATER WOULD BE DISCHARGED TO THE ON-SITE STORMWATER RETENTION BASIN FOR DISPOSAL. THIS ALTERNATIVE IS NOT EXPECTED TO EMIT ORGANIC VAPORS IN LEVELS WHICH WOULD CAUSE ENVIRONMENTAL OR PUBLIC HEALTH CONCERNS DUE TO LOW CONTAMINANT LEVELS AND RAPID DISPERSION.

DESIGN OF SELECTED REMEDY

- RECOVERY WELL NETWORK - THE REMEDIAL DESIGN CONSISTS OF A SYSTEM OF FIVE WELLS PUMPING AT 36 GPM EACH INSTALLED TO CAPTURE THE ZONE OF CONTAMINATED WATER. THE WELLS WOULD BE SPACED ALONG THE DOWN-GRADIENT BOUNDARY OF THE CONTAMINANT ZONE WITH A WELL AT THE CENTER AND EACH OF THE OTHER WELLS SPACED 260 FEET APART. FIVE (5) WELLS WERE SELECTED IN ORDER TO PROVIDE A MARGIN OF FLEXIBILITY FOR INCREASING PUMPING RATES AND FOR SELECTIVELY PUMPING AT DIFFERENT PORTIONS OF THE ZONE OF CONTAMINATION AS OTHER PORTIONS BEGIN TO CLEAN UP. THE RECOVERY WELL LOCATIONS ARE PRESENTED IN FIGURE 3.

- RECOVERY SYSTEM MONITORING - THE AREA BEING AFFECTED BY THE RECOVERY SYSTEM WILL BE MONITORED BY DETERMINING WATER LEVELS INSIDE AND OUTSIDE OF THE CAPTURE ZONE TO EVALUATE THE HYDRAULIC PERFORMANCE OF THE SYSTEM. DURING SYSTEM START-UP THESE LEVELS WILL BE MEASURED FREQUENTLY TO ASSESS SYSTEM PERFORMANCE. LATER, WATER LEVELS WILL BE MEASURED ON A QUARTERLY BASIS IN THE RECOVERY WELLS AND A SYSTEM OF WATER LEVEL MONITORING WELLS WILL BE INSTALLED TO MONITOR THE RECOVERY WELL SYSTEM. THIS WILL ENSURE THAT THE RECOVERY SYSTEM IS RECOVERING WATER FROM THE PROPER AREA WITHIN THE AQUIFER.

- OFF-SITE MONITORING SYSTEM - THE OFF-SITE MONITORING SYSTEM WILL CONSIST OF MONITORING WELLS LOCATED IN THE VICINITY OF THE OFF-SITE GROUNDWATER RECOVERY OPERATION. THE SYSTEM WILL CONSIST OF FIVE (5) OF THE TMW-SERIES WELLS. THE WELL DEPTHS FOR THIS MONITORING SYSTEM ARE OF THE INTERMEDIATE DEPTH (60-75 FEET.) IN THE AQUIFER - THE SAME ZONE WHERE THE CONTAMINATED GROUND WATER IS LOCATED. THE LOCATION FOR THESE WELLS IS DEPICTED IN FIGURE 4.

DURING THE OFF-SITE GROUNDWATER RECOVERY OPERATION, THESE WELLS WILL BE SAMPLED QUARTERLY FOR VOLATILE ORGANIC COMPOUNDS AND FOR METALS. THE SYSTEM GOAL IS TO MEET THE REMEDIATION GOALS (LISTED IN TABLE 1) IN THE WELLS, INDICATING THAT THE PLUME HAS BEEN RECOVERED.

- RECOVERED GROUNDWATER TREATMENT - RECOVERED GROUND WATER WILL BE ROUTED VIA A PIPELINE TO THE CLOSED LANDFILL SITE. VOLATILE ORGANIC CONTAMINANTS (VOCS) WILL BE REMOVED BY AIR STRIPPING ON THE SITE. THE SYSTEM DESIGN CONSISTS OF TWO AIR STRIPPING TOWERS (36-INCH DIAMETER, 14 FEET HIGH) RATED AT 100 GPM OF WATER EACH AND CAPABLE OF REMOVING THE VOLATILE CONCENTRATIONS TO BELOW MCLS. METALS CONCENTRATIONS IN THE WATER DISCHARGED TO THE STORMWATER RETENTION BASIN WILL MEET MCLS.

- GROUND WATER RECOVERY AND TREATMENT SYSTEM AIR IMPACTS - IN ORDER TO BETTER DEFINE THE AIR IMPACTS ASSOCIATED WITH THE OPERATION OF THE GROUNDWATER RECOVERY AND TREATMENT SYSTEM, A DETAILED ANALYSIS OF THE SYSTEM WAS CONDUCTED. THE ANALYSIS ASSUMED THAT THE RECOVERY EFFORT WAS DIVIDED INTO THREE TIME INTERVALS. EACH INTERVAL WOULD LAST ROUGHLY SIX MONTHS AND WOULD APPROXIMATE THE TIME REQUIRED TO RECOVER ONE-THIRD OF THE VOLUME OF THE PLUME (ONE-THIRD OF THE PORE VOLUME). USING THE INFORMATION FROM THE CAPTURE ZONE ANALYSIS PREPARED AS PART OF THE SYSTEM DESIGN, AVERAGE CONCENTRATIONS FOR SPECIFIC CONTAMINANTS WERE CALCULATED FOR EACH TIME INTERVAL. USING THESE CONCENTRATIONS, THE FLOW RATE THROUGH THE STRIPPERS, AND ASSUMING CONTINUOUS OPERATION, THE POUNDS/DAY RELEASED INTO THE AIR WAS CALCULATED FOR EACH CONTAMINANT. THE TOTAL EMISSION RATE PER DAY WAS CALCULATED FOR COMPARISON WITH THE GUIDELINES PRESENTED IN THE EPA GUIDANCE DOCUMENT TITLED CONTROL OF AIR EMISSIONS FROM SUPERFUND AIR STRIPPERS AT SUPERFUND GROUNDWATER SITES (OSWER DIRECTIVE 9355.0-28). THIS GUIDANCE DOCUMENT SAYS THAT CONTROL OF AIR EMISSIONS FROM SUPERFUND AIR STRIPPERS SHOULD BE CONSIDERED WHEN THE ACTUAL EMISSION RATE EXCEEDS 15 #/DAY AND THE RELEASE IS IN AN OZONE NON-ATTAINMENT AREA. (THE HIPPS ROAD LANDFILL SITE IS LOCATED IN A NON-ATTAINMENT AREA.) THE EMISSION RATE FROM THIS AIR STRIPPING SYSTEM IS CALCULATED TO RANGE FROM 0.013 #/DAY DURING INTERVAL ONE TO A SYSTEM MAXIMUM OF 0.048 #/DAY IN INTERVAL TWO. IT DROPS OFF TO 0.04 #/DAY IN INTERVAL THREE. MONITORING DURING OPERATION WILL CONFIRM THE ACTUAL EMISSION RATE. CLEARLY THE EMISSION RATE ANTICIPATED FROM THE AIR STRIPPING SYSTEM IS MUCH BELOW THE CRITERIA FOR CONSIDERING CONTROLS ESTABLISHED FOR THE SUPERFUND PROGRAM.

AN AIR POLLUTION MODEL WAS THEN USED TO PREDICT THE CONCENTRATION AT THE NEAREST RESIDENCE. CERTAIN CONSERVATIVE ASSUMPTIONS WERE USED FOR THE AIR MODEL - THE WIND WAS ASSUMED TO BLOW THE CONTAMINANTS TOWARD THE RESIDENCE 100 PERCENT OF THE TIME AND METEOROLOGICAL CONDITIONS CONTRIBUTED ONLY MINIMALLY TO DISPERSION. THE RESULTING CONCENTRATIONS WERE COMPARED WITH THE GUIDELINES PROVIDED IN THE FLORIDA DEPARTMENT OF ENVIRONMENTAL REGULATION INTEROFFICE MEMORANDUM TITLED FINAL AIR STRIPPER REVIEW PROCEDURES: OCTOBER 20, 1987. FINALLY, THE CONCENTRATIONS AT THE NEAREST RESIDENCE WERE COMPARED TO THOSE CONCENTRATIONS THAT MIGHT BE EXPECTED TO CONTRIBUTE ONE EXCESS CANCER IN A POPULATION OF 1,000,000 INDIVIDUALS IF THEY WERE ALL EXPOSED TO THIS CONCENTRATION CONTINUOUSLY FOR A PERIOD OF 70 YEARS. AS A RESULT OF THIS ANALYSIS, THE PREDICTED CONCENTRATIONS OF CONTAMINANTS AT THE NEAREST RESIDENCE TO THE HIPPS ROAD LANDFILL ARE WELL BELOW BOTH FDER STANDARDS FOR ACCEPTABLE ALLOWABLE CONCENTRATIONS AND EPA GUIDELINES FOR CANCER RISK ASSOCIATED WITH EXPOSURE (TO CONTAMINANTS) FOR A LIFETIME.

- TREATED WATER DISPOSAL - TREATED WATER WILL BE DISCHARGED TO THE STORM WATER RETENTION BASIN ON SITE AND WILL RECHARGE THE AQUIFER. AN ANALYSIS OF THE EFFECTS OF THIS DISCHARGE ON AREA GROUNDWATER FLOW CHARACTERISTICS SHOWS THAT THE EFFECT IS MINIMAL.

- NEAR-SITE MONITORING WELL SYSTEM - A GROUNDWATER MONITORING SYSTEM WILL BE ESTABLISHED AT THE HIPPS ROAD LANDFILL SITE TO PROVIDE AN EARLY WARNING SYSTEM FOR THE RELEASE OF CONTAMINANTS FROM THE LANDFILL. IF SITE RELATED CONTAMINANTS ARE DETECTED BY THIS SYSTEM, THE GROUNDWATER RECOVERY OPERATION WILL BE INITIATED OR CONTINUED. THIS SYSTEM WILL BE MONITORED FOR 20 YEARS. THE APPROPRIATE MONITORING WELL LOCATIONS ARE SHOWN IN FIGURE 5.

COST ESTIMATE

THE GROUNDWATER RECOVERY AND DISPOSAL SYSTEM HAS BEEN BROKEN DOWN INTO FOUR COMPONENTS: RECOVERY SYSTEM COSTS, ON-SITE TREATMENT AND DISPOSAL SYSTEM COSTS, GROUNDWATER MONITORING COSTS, AND INSPECTION AND MAINTENANCE COSTS.

THE RECOVERY SYSTEM COST IS ESTIMATED TO BE $88,000. THE ON-SITE TREATMENT AND DISPOSAL COSTS WOULD BE APPROXIMATELY $76,600. THE GROUNDWATER MONITORING SYSTEM COST IS ESTIMATED TO BE $499,500. THESE ESTIMATES ARE CALCULATED AT PRESENT WORTH FOR 5 YEARS AT 5 PERCENT INTEREST. THE INSPECTION AND MAINTENANCE (I&M) PROGRAM WILL INCLUDE ROUTINE WEEKLY INSPECTIONS, A YEARLY MONITORING AND PERFORMANCE REPORT, AND A MAJOR CAPITAL REPLACEMENT CONTINGENCY. THE I & M PROGRAM IS ESTIMATED AT $370,600. THE TOTAL REMEDIAL ACTION COST IS $1,242,000.

OPERATION & MAINTENANCE

GROUNDWATER RECOVERY

THE GROUNDWATER RECOVERY AND DISPOSAL SYSTEM WILL BE MONITORED WEEKLY FOR THE FIRST MONTH AFTER THE INITIAL PHASE OR START-UP, MONTHLY FOR THE FIRST QUARTER AND QUARTERLY THEREAFTER. THIS APPLIES TO BOTH THE WATER LEVEL MONITORING AND THE OFF-SITE MONITORING WELL SYSTEMS. THE OPERATIONAL LIFE FOR THE PROJECT HAS BEEN ASSUMED TO BE APPROXIMATELY FIVE YEARS.

INSTITUTIONAL CONTROLS

THE AMENDED GROUNDWATER REMEDY WILL NOT REQUIRE ANY INSTITUTIONAL CONTROLS BEYOND THOSE ENVISIONED IN THE 1986 ROD.

STATUTORY REQUIREMENTS

THE US EPA AND FDER BELIEVE THAT THIS REMEDY WILL SATISFY THE STATUTORY REQUIREMENTS OF PROVIDING PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT, ATTAINING APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS OF OTHER ENVIRONMENTAL STATUTES, WILL BE COST-EFFECTIVE AND WILL UTILIZE PERMANENT SOLUTIONS AND ALTERNATIVE TREATMENT TECHNOLOGIES OR RESOURCE RECOVERY TECHNOLOGIES TO THE MAXIMUM EXTENT PRACTICABLE. SECTIONS 8.1 THROUGH 8.5 BELOW ARE THE STATUTORY REQUIREMENTS FOR THIS SITE.

PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT

THE SELECTED REMEDY PROVIDES PROTECTION OF THE PUBLIC HEALTH AND ENVIRONMENT THROUGH EXTRACTION AND TREATMENT OF CONTAMINATED GROUND WATER.

ATTAINMENT OF THE APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (ARARS)

REMEDIAL ACTIONS PERFORMED UNDER CERCLA MUST COMPLY WITH ALL APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (ARARS). ALL ALTERNATIVES CONSIDERED FOR THE HIPPS ROAD SITE WERE EVALUATED ON THE BASIS OF THE DEGREE TO WHICH THEY COMPLIED WITH THESE REQUIREMENTS. THE SELECTED REMEDY WAS FOUND TO MEET OR EXCEED THE FOLLOWING ARARS, AS DISCUSSED BELOW.

CLEAN WATER ACT/SAFE DRINKING WATER ACT

EPA'S DETERMINATION OF APPROPRIATE GROUNDWATER CLEANUP CRITERIA INVOLVES AN EVALUATION OF CONTAMINANT CONCENTRATIONS RELATIVE TO AVAILABLE HEALTH-BASED STANDARDS. MAXIMUM CONCENTRATION LIMITS (MCLS) AND MAXIMUM CONCENTRATION LIMIT GOALS (MCLGS) OF THE SAFE DRINKING WATER ACT (SDWA)(40 CFR PART 141 AND 142),AND FEDERAL AMBIENT WATER QUALITY CRITERIA (AWQC) OF THE CLEAN WATER ACT (CWA) (40 CFR 122.44) WILL BE MET AT THIS SITE.

FEDERAL CLEAN AIR ACT

THE OBJECTIVE OF THE CLEAN AIR ACT (CAA) IS TO PROTECT AND ENHANCE THE QUALITY OF THE NATION'S AIR RESOURCES IN ORDER TO PROMOTE AND MAINTAIN PUBLIC HEALTH AND WELFARE AND THE PRODUCTIVE CAPACITY OF THE POPULATION. THE CAA ACHIEVES THIS OBJECTIVE BY REGULATING EMISSIONS INTO THE AIR. PURSUANT TO THE CAA, EPA HAS PROMULGATED NATIONAL AMBIENT AIR QUALITY STANDARDS. THE CAA IS AN ARAR AND THE REGULATORY STANDARDS OF THE CAA WILL BE COMPLIED WITH DURING IMPLEMENTATION OF THE REMEDY. ENDANGERED SPECIES ACT

THE SELECTED REMEDY IS PROTECTIVE OF SPECIES LISTED AS ENDANGERED OR THREATENED UNDER THE ENDANGERED SPECIES ACT. REQUIREMENTS OF THE INTERAGENCY SECTION 7 CONSULTATION PROCESS, 50 CFR PART 402, WILL BE MET. THE DEPARTMENT OF INTERIOR, FISH AND WILDLIFE SERVICE, WILL BE CONSULTED DURING REMEDIAL DESIGN TO ASSURE THAT ENDANGERED OR THREATENED SPECIES ARE NOT ADVERSELY IMPACTED BY IMPLEMENTATION OF THIS REMEDY. THERE IS CURRENTLY NO INFORMATION TO INDICATE THAT THE SITE IS VISITED BY, OR CONTAINS ANY ENDANGERED OR THREATENED SPECIES.

NATIONAL HISTORICAL PRESERVATION ACT (NHPA)

THE NHPA REQUIRES THAT ACTION BE TAKEN TO PRESERVE OR RECOVER HISTORICAL OR ARCHAEOLOGICAL ITEMS OF IMPORTANCE WHICH MIGHT BE DESTROYED AS A RESULT OF SITE ACTIVITIES. THERE IS NO INFORMATION TO INDICATE THAT THE HIPPS ROAD SITE CONTAINS ANY ITEMS OF HISTORICAL OR ARCHAEOLOGICAL SIGNIFICANCE.

FEDERAL OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION ACT (OSHA)

THE SELECTED REMEDIAL ACTION CONTRACTOR WILL DEVELOP AND IMPLEMENT A HEALTH AND SAFETY PROGRAM FOR ITS WORKERS. ALL ON-SITE WORKERS WILL MEET THE MINIMUM TRAINING AND MEDICAL MONITORING REQUIREMENTS OUTLINED IN 40 CFR 1910.

STATE REGULATIONS:

FLORIDA ADMINISTRATIVE CODE CHAPTER 17-3

WATER QUALITY STANDARDS FOR SURFACE WATER AND GROUND WATER AFFECTED BY LEACHATE AND STORM RUNOFF FROM THE SITE WILL BE MET.

FLORIDA AIR AND WATER POLLUTION CONTROL ACT

THIS ACT MAKES IT PUBLIC POLICY TO ACHIEVE AND MAINTAIN SUCH LEVELS OF AIR QUALITY TO BE PROTECTIVE OF HUMAN HEALTH AND SAFETY AND, TO THE GREATEST DEGREE PRACTICABLE, PREVENT INJURY TO PLANT AND ANIMAL LIFE AND PROPERTY. THE FLORIDA AIR AND WATER POLLUTION CONTROL ACT (CHAPTER 403 F.S.) IS AN ARAR AND THE REGULATORY STANDARDS OF THE ACT WILL BE COMPLIED WITH DURING IMPLEMENTATION OF THE REMEDY.

COST EFFECTIVENESS

BECAUSE OF ESCALATING POTW COSTS, THE REMEDY SELECTED IN THE SEPTEMBER 1986 ROD COULD NOW COST $3.9 TO $4.4 MILLION. THE ON-SITE TREATMENT OPTION IS CURRENTLY ESTIMATED AT $1.2 MILLION (FEBRUARY, 1990) AND INCLUDES OPERATION AND MAINTENANCE.

UTILIZATION OF PERMANENT SOLUTIONS AND ALTERNATIVE TREATMENT TECHNOLOGY OR RESOURCE RECOVERY TECHNOLOGIES TO THE MAXIMUM EXTENT PRACTICABLE

US EPA BELIEVES THE SELECTED REMEDY IS THE MOST APPROPRIATE CLEANUP SOLUTION FOR THE HIPPS ROAD SITE AND PROVIDES THE BEST BALANCE AMONG THE EVALUATION CRITERIA FOR THE REMEDIAL ALTERNATIVES EVALUATED. THIS REMEDY PROVIDES EFFECTIVE PROTECTION IN BOTH THE SHORT- AND LONG-TERM TO POTENTIAL HUMAN AND ENVIRONMENTAL RECEPTORS, IS READILY IMPLEMENTED, AND IS COST EFFECTIVE.

EXTRACTION, AIR STRIPPING AND DISPOSAL OF THE CONTAMINATED GROUND WATER REPRESENTS A PERMANENT SOLUTION (THROUGH TREATMENT) WHICH WILL EFFECTIVELY REDUCE AND/OR ELIMINATE MOBILITY OF HAZARDOUS WASTES AND HAZARDOUS SUBSTANCES INTO THE ENVIRONMENT.

PREFERENCE FOR TREATMENT AS A PRINCIPAL ELEMENT

TREATMENT OF THE CONTAMINANTS WILL EFFECTIVELY PREVENT THEM FROM POSING A THREAT THROUGH DIRECT CONTACT OR BY LEACHING TO GROUND WATER.

#RS

RESPONSIVENESS SUMMARY

INTRODUCTION

THE US ENVIRONMENTAL PROTECTION AGENCY (EPA) ESTABLISHED A PUBLIC COMMENT PERIOD FROM JULY 1, 1990 THROUGH AUGUST 31, 1990 FOR INTERESTED PARTIES TO COMMENT ON EPA'S AMENDED PROPOSED REMEDIAL ACTION PLAN (PRAP) FOR THE HIPPS ROAD LANDFILL SITE. (THE CITIZENS IN JACKSONVILLE REQUESTED AND WERE GRANTED A 30 DAY EXTENSION TO THE INITIAL COMMENT PERIOD.) THE COMMENT PERIOD FOLLOWED A PUBLIC MEETING ON JULY 11, 1990, CONDUCTED BY EPA, HELD AT THE AUDITORIUM OF THE JACKSONVILLE PUBLIC LIBRARY, WEBB WISCONNETT BRANCH IN JACKSONVILLE, FLORIDA. THE MEETING PRESENTED THE RESULTS OF THE STUDIES UNDERTAKEN AND THE MODIFIED PREFERRED REMEDIAL ALTERNATIVE FOR THE SITE.

A RESPONSIVENESS SUMMARY IS REQUIRED BY SUPERFUND POLICY TO PROVIDE A SUMMARY OF CITIZEN COMMENTS AND CONCERNS ABOUT THE SITE, AS RAISED DURING THE PUBLIC COMMENT PERIOD, AND THE RESPONSES TO THOSE CONCERNS. ALL COMMENTS SUMMARIZED IN THIS DOCUMENT HAVE BEEN FACTORED INTO THE AGENCY DECISION OF THE ALTERNATIVE FOR CLEANUP OF THE GROUND WATER AT THE HIPPS ROAD LANDFILL SITE.

THIS RESPONSIVENESS SUMMARY FOR THE HIPPS ROAD LANDFILL SITE IS DIVIDED INTO THE FOLLOWING SECTIONS.

OVERVIEW

THIS SECTION DISCUSSES THE RECOMMENDED ALTERNATIVE FOR REMEDIAL ACTION AND THE PUBLIC REACTION TO THIS ALTERNATIVE.

BACKGROUND ON COMMUNITY INVOLVEMENT

THIS SECTION PROVIDES A BRIEF HISTORY OF COMMUNITY INTEREST AND CONCERNS REGARDING THE HIPPS ROAD LANDFILL SITE.

SUMMARY OF MAJOR QUESTIONS AND COMMENTS RECEIVED AND AGENCY RESPONSE

THIS SECTION PRESENTS BOTH ORAL AND WRITTEN COMMENTS SUBMITTED DURING THE PUBLIC COMMENT PERIOD, AND PROVIDES THE RESPONSES TO THESE COMMENTS.

REMAINING CONCERNS

THIS SECTION DISCUSSES COMMUNITY CONCERNS THAT EPA SHOULD BE AWARE OF IN DESIGN AND IMPLEMENTATION OF THE REMEDIAL ALTERNATIVE FOR THE SITE.

OVERVIEW

THE PROPOSED PLAN TO MODIFY THE PREFERRED ALTERNATIVE FOR GROUNDWATER RECOVERY WAS PRESENTED TO THE PUBLIC IN A FACT SHEET RELEASED ON JUNE 30, 1990 AND AT A PUBLIC MEETING HELD ON JULY 11, 1990. THE MODIFIED RECOMMENDED ALTERNATIVE ADDRESSES THE GROUNDWATER CONTAMINATION BY EXTRACTION, AIR STRIPPING AND DISPOSAL ON-SITE INSTEAD OF EXTRACTION AND DISPOSAL AT THE PUBLICLY OWNED TREATMENT WORKS (POTW). THE MAJOR COMPONENTS OF THE RECOMMENDED ALTERNATIVE INCLUDE:

- A SYSTEM OF RECOVERY WELLS INSTALLED TO CAPTURE THE CONTAMINATED WATER.

- RECOVERY MONITORING SYSTEM TO DETERMINE WATER LEVELS INSIDE AND OUTSIDE OF THE CAPTURE ZONE TO EVALUATE THE HYDRAULIC PERFORMANCE OF THE SYSTEM.

- AN OFF-SITE MONITORING SYSTEM CONSISTING OF MONITORING WELLS LOCATED IN THE VICINITY OF THE OFF-SITE GROUNDWATER RECOVERY OPERATION. DURING THE GROUNDWATER RECOVERY OPERATION, THESE WELLS WILL BE SAMPLED QUARTERLY FOR VOLATILE ORGANIC COMPOUNDS TO DETERMINE THE EFFECTIVENESS OF THE RECOVERY SYSTEM.

- RECOVERED GROUND WATER WILL BE ROUTED VIA A PIPELINE TO THE CLOSED LANDFILL SITE. VOLATILE ORGANIC CONTAMINANTS(VOCS) WILL BE REMOVED BY AIR STRIPPING ON THE SITE. DISCHARGED WATER WILL MEET THE MCLS.

THE COMMUNITY, IN GENERAL, IS CONCERNED ABOUT THE POTENTIAL FOR CONTAMINANT RELEASE FROM THE AIR STRIPPING SYSTEM. THE RECORD OF DECISION AMENDMENT AND THIS RESPONSIVENESS SUMMARY ADDRESSES THE CONCERN IN DETAIL.

BACKGROUND ON COMMUNITY INVOLVEMENT AND CONCERN

THE JACKSONVILLE COMMUNITY HAS BEEN AWARE OF THE CONTAMINATION PROBLEM AT THE HIPPS ROAD LANDFILL SITE FOR SEVERAL YEARS. EPA PREPARED A RECORD OF DECISION (ROD) ON SEPTEMBER 3, 1986. IN SEPTEMBER 1988, A FACT SHEET WAS PUBLISHED TO INFORM THE PUBLIC OF PLANNED REMEDIAL DESIGN ACTIVITIES.

A PUBLIC MEETING WAS HELD BY EPA ON APRIL 5, 1989 TO PRESENT A SCHEDULE FOR IMPLEMENTATION OF REMEDIAL DESIGN ACTIVITIES AT THE SITE. THE MEETING ALSO SERVED TO INFORM CITIZENS OF THE PARTIAL CONSENT DECREE ENTERED BY THE FEDERAL DISTRICT COURT IN JACKSONVILLE ON JANUARY 25, 1989.

EPA CONDUCTED A PUBLIC INFORMATION MEETING ON AUGUST 15, 1989 TO PRESENT THE DESIGN FOR THE LANDFILL CLOSURE TO INTERESTED CITIZENS AND LOCAL OFFICIALS AND TO PROVIDE AN OPPORTUNITY FOR FURTHER DISCUSSION OF CONCERNS RAISED BY CITIZENS DURING THE PREVIOUS APRIL 5, 1989 MEETING. EPA CONDUCTED ANOTHER PUBLIC MEETING ON JULY 11, 1990. AT THE MEETING, EPA, IN CONSULTATION WITH FDER, ANNOUNCED TO CITIZENS THAT THE AGENCY WAS CONSIDERING MODIFYING THE PROPOSED ALTERNATIVE FOR GROUNDWATER RECOVERY BASED ON NEW INFORMATION AFFECTING THE COST EFFECTIVENESS OF TWO ALTERNATIVES. A 30 DAY PUBLIC COMMENT PERIOD WAS INITIATED AND WAS EXTENDED 30 DAYS AT THE REQUEST OF CITIZENS. THE COMMENT PERIOD ENDED ON AUGUST 31, 1990.

GROUNDWATER CONTAMINATION CONCERNS: PROPERTY OWNERS WERE CONCERNED WITH THE CONTAMINANTS TO BE EMITTED FROM THE AIR STRIPPING SYSTEM. THE CITIZENS WERE ALSO CONCERNED THAT PRIVATE WELLS WERE STILL BEING DRILLED IN THE AREA.

SUMMARY OF MAJOR QUESTIONS AND COMMENTS RECEIVED DURING THE PUBLIC COMMENT PERIOD AND EPA'S RESPONSES.

<u>HEALTH ISSUES</u>

1. THE AIRBORNE CHEMICALS PRODUCED AS A RESULT OF THE PROPOSED RECOVERY SYSTEM ARE GOING TO BE VERY DANGEROUS FOR ME AND MY FAMILY TO BE BREATHING. PLEASE HALT ALL PLANS TO INSTALL THE PROPOSED RECOVERY SYSTEM UNTIL IT CAN BE DETERMINED, WITHOUT ANY DOUBTS, THAT IT WILL BE SAFE FOR ALL RESIDENTS LIVING IN THE DIRECT VICINITY OF THE SITE.

EPA RESPONSE: IN ORDER TO BETTER DEFINE THE AIR IMPACTS ASSOCIATED WITH THE OPERATION OF THE GROUNDWATER RECOVERY AND TREATMENT SYSTEM, A DETAILED ANALYSIS OF THE SYSTEM WAS CONDUCTED. THE ANALYSIS ASSUMED THAT THE RECOVERY EFFORT WAS DIVIDED INTO THREE TIME INTERVALS. EACH INTERVAL WOULD LAST ROUGHLY SIX MONTHS AND WOULD APPROXIMATE THE TIME REQUIRED TO RECOVER ONE-THIRD OF THE VOLUME OF THE PLUME (ONE-THIRD OF THE PORE VOLUME). USING THE INFORMATION FROM THE CAPTURE ZONE ANALYSIS PREPARED AS PART OF THE SYSTEM DESIGN, AVERAGE CONCENTRATIONS FOR SPECIFIC CONTAMINANTS WERE CALCULATED FOR EACH TIME INTERVAL. USING THESE CONCENTRATIONS, THE FLOW RATE

THROUGH THE STRIPPERS, AND ASSUMING CONTINUOUS OPERATION, THE POUNDS/DAY RELEASED INTO THE AIR WAS CALCULATED FOR EACH CONTAMINANT. THE TOTAL EMISSION RATE PER DAY WAS CALCULATED FOR COMPARISON WITH THE GUIDELINES PRESENTED IN THE EPA GUIDANCE DOCUMENT TITLED CONTROL OF AIR EMISSIONS FROM SUPERFUND AIR STRIPPERS AT SUPERFUND GROUNDWATER SITES (OSWER DIRECTIVE 9355.0-28).
THIS GUIDANCE DOCUMENT SAYS THAT CONTROL OF AIR EMISSIONS FROM SUPERFUND AIR STRIPPERS SHOULD BE CONSIDERED WHEN THE ACTUAL EMISSION RATE EXCEEDS 15 #/DAY AND THE RELEASE IS IN AN OZONE NON-ATTAINMENT AREA. (THE HIPPS ROAD LANDFILL SITE IS LOCATED IN A NON-ATTAINMENT AREA.) THE EMISSION RATE FROM THIS AIR STRIPPING SYSTEM IS CALCULATED TO RANGE FROM 0.013 #/DAY DURING INTERVAL ONE TO A SYSTEM MAXIMUM OF 0.048 #/DAY IN INTERVAL TWO.

IT DROPS OFF TO 0.04 #/DAY IN INTERVAL THREE. MONITORING DURING OPERATION WILL CONFIRM THE ACTUAL EMISSION RATE. CLEARLY THE EMISSION RATE ANTICIPATED FROM THE AIR STRIPPING SYSTEM IS MUCH BELOW THE CRITERIA FOR CONSIDERING CONTROLS ESTABLISHED FOR THE SUPERFUND PROGRAM.

AN AIR POLLUTION MODEL WAS THEN USED TO PREDICT THE CONCENTRATION AT THE NEAREST RESIDENCE. CERTAIN CONSERVATIVE ASSUMPTIONS WERE USED FOR THE AIR MODEL - THE WIND WAS ASSUMED TO BLOW THE CONTAMINANTS TOWARD THE RESIDENCE 100 PERCENT OF THE TIME AND METEOROLOGICAL CONDITIONS CONTRIBUTED ONLY MINIMALLY TO DISPERSION. THE RESULTING CONCENTRATIONS WERE COMPARED WITH THE GUIDELINES PROVIDED IN THE FLORIDA DEPARTMENT OF ENVIRONMENTAL REGULATION INTEROFFICE MEMORANDUM TITLED FINAL AIR STRIPPER REVIEW PROCEDURES: OCTOBER 20. 1987. FINALLY, THE CONCENTRATIONS AT THE NEAREST RESIDENCE WERE COMPARED TO THOSE CONCENTRATIONS THAT MIGHT BE EXPECTED TO CONTRIBUTE ONE EXCESS CANCER IN A POPULATION OF 1,000,000 INDIVIDUALS IF THEY WERE ALL EXPOSED TO THIS CONCENTRATION CONTINUOUSLY FOR A PERIOD OF 70 YEARS. THE PREDICTED CONCENTRATIONS OF CONTAMINANTS AT THE NEAREST RESIDENCE TO THE HIPPS ROAD LANDFILL ARE WELL BELOW BOTH FDER STANDARDS FOR ACCEPTABLE AMBIENT CONCENTRATIONS AND EPA GUIDELINES FOR CANCER RISK ASSOCIATED WITH EXPOSURE (TO CONTAMINANTS) FOR A LIFETIME.

2. WHAT IMPACT MIGHT THE AIR EMISSIONS FROM THE AIR STRIPPER HAVE ON AN ASTHMATIC OR SENSITIVE INDIVIDUAL LIVING NEXT TO THE SITE?

EPA RESPONSE: AN AIR IMPACT MODEL WAS USED TO PREDICT THE CONCENTRATION OF AIR EMISSIONS FROM THE AIR STRIPPING SYSTEM AT THE NEAREST RESIDENCE. THE CONCENTRATIONS WERE COMPARED TO THOSE CONCENTRATIONS THAT MIGHT BE EXPECTED TO CONTRIBUTE ONE EXCESS CANCER IN A POPULATION OF ONE MILLION INDIVIDUALS IF THEY WERE ALL EXPOSED TO THIS CONCENTRATION CONTINUOUSLY FOR A PERIOD OF 70 YEARS. THE RESULTS OF THIS ANALYSIS SHOWED THAT CONCENTRATIONS AT THE NEAREST RESIDENCE TO THE LANDFILL WERE WELL BELOW BOTH THE STATE OF FLORIDA STANDARDS FOR ACCEPTABLE AMBIENT CONCENTRATIONS AND EPA GUIDELINES FOR CANCER RISK ASSOCIATED WITH EXPOSURE (TO CONTAMINANTS) FOR A LIFETIME. HOW THE SENSITIVE INDIVIDUAL MIGHT BE EFFECTED CANNOT BE PROJECTED FROM THE CANCER RISK. HOWEVER, CONCENTRATIONS THAT RESULT IN AN "ACCEPTABLE" CANCER RISK (ONE IN ONE MILLION) ARE GENERALLY MUCH LOWER THAN THE CONCENTRATIONS THAT WOULD BE "ACCEPTABLE" IF WE WERE CONSIDERING ONLY A CHEMICAL'S NON CARCINOGENIC EFFECTS AND NOT ITS CANCER POTENCY. IN ADDITION, AN EXAMINATION OF THE TOXIC EFFECTS OF BOTH VINYL CHLORIDE AND BENZENE INDICATES THAT NEITHER CHEMICAL TARGETS THE PULMONARY SYSTEM. THEREFORE, WE HAVE NO DATA TO INDICATE THAT AIR EMISSIONS WILL HAVE ANY ADVERSE IMPACT ON AN ASTHMATIC OR SENSITIVE PERSON LIVING NEAR THE SITE.

3. WHY TAKE THE RISK OF DISCHARGING ANY CHEMICALS INTO THE NEIGHBORHOOD AT ALL? HAS ANYONE LOOKED INTO THE TECHNOLOGY AND THE COST EFFECTIVENESS OF ADDING A CARBON FILTER TO THE AIR STRIPPING TO ELIMINATE ALL OF THE CONTAMINANTS?

EPA RESPONSE: THE TECHNOLOGY FOR POLISHING AIR EMISSIONS WITH CARBON TREATMENT SYSTEMS IS ONE WITH A TRACK RECORD. HOWEVER, FOR THE LOW CONTAMINANT CONCENTRATION IN THE EMISSIONS FOR THE HIPPS ROAD LANDFILL SITE, THE CARBON TREATMENT SYSTEM PERFORMANCE WOULD BE QUESTIONABLE. THE SUPPLIERS FOR SUCH A FILTER TREATMENT PROVIDED A COST ESTIMATE OF BETWEEN $40,000 TO $280,000 FOR A TWO YEAR OPERATING LIFE.

IT SHOULD BE NOTED THAT AN ANALYSIS OF ADDING A CARBON FILTER TO THE AIR STRIPPING SYSTEM WAS NOT DONE PREVIOUSLY IN THIS CASE BECAUSE THE CONCENTRATION OF THE CONTAMINANTS PROJECTED TO BE RELEASED FALLS ORDERS OF MAGNITUDES BELOW THE LEVEL THAT NORMALLY TRIGGERS ITS CONSIDERATION UNDER NATIONAL GUIDELINES.

4. EPA ALWAYS SEEMS TO PLACE A PRIORITY ON AN ECONOMIC REMEDY BEFORE IT CONSIDERS THE PUBLIC HEALTH.

EPA RESPONSE: THE FIRST PRIORITY THE AGENCY CONSIDERS WHEN SELECTING A REMEDIAL ALTERNATIVE IS THE PROTECTION OF HUMAN HEALTH. HOWEVER, CONGRESS CLEARLY SPELLS OUT IN THE (CERCLA) LAW THAT REMEDIES WHICH ARE EQUALLY PROTECTIVE OF HEALTH AND THE ENVIRONMENT ALSO MUST BE COMPARED FOR COST EFFECTIVENESS.

TECHNICAL ISSUES

5. IS IT TRUE THAT EPA HAS NO MEASURABLE LIMITS FOR VINYL CHLORIDE (A SITE-RELATED CONTAMINANT) BECAUSE IT IS SO DANGEROUS?

EPA RESPONSE: THERE IS A NATIONAL PRIMARY DRINKING WATER STANDARD FOR VINYL CHLORIDE. VINYL CHLORIDE IS ALSO A CARCINOGEN. UNDER THE ABOVE STANDARD THE MAXIMUM CONTAMINANT LEVEL OR THE MCL MUST BE ATTAINED WHEN REMEDIATING THE GROUND WATER. THE MCL (THE FEDERAL STANDARD) FOR VINYL CHLORIDE IS TWO PARTS PER BILLION. THE STATE OF FLORIDA STANDARD IS ONE PART PER BILLION.

6. HOW WOULD EPA RESPOND TO STATEMENTS ATTRIBUTED TO MR. BENJAMIM ROSS WHO CLAIMS THAT SAMPLES BEING COLLECTED NOW ARE NOT BEING ANALYZED FOR THE RIGHT CHEMICALS?

EPA RESPONSE: THE TESTING CONDUCTED AT THIS SITE, OR ANY SUPERFUND SITE, IS NOT LIMITED TO ONLY THOSE CHEMICALS FOR WHICH THERE EXISTS A STANDARD. THE ANALYTICAL METHODS AND EQUIPMENT USED CAN - AND HAVE - DETECTED OTHER CONTAMINANTS THAN THOSE COMMONLY ASSOCIATED WITH THE SITE. WHILE THE EQUIPMENT IS NOT ALWAYS ABLE TO SPECIFICALLY IDENTIFY THE CONTAMINANT, IT DOES REPORT USEFUL INFORMATION ABOUT THEM.

THE ANALYTICAL DATA SHEETS LIST THOSE AS MISCELLANEOUS COMPOUNDS. WHEN DETECTED AT THIS SITE, THEIR TOTAL CONCENTRATIONS HAVE NOT BEEN HIGH ENOUGH TO WARRANT FURTHER INVESTIGATION.

7. I UNDERSTAND THAT THE REMEDY WILL CAPTURE VINYL CHLORIDE, BUT THAT DICHLOROETHYLENE WAS PRESENT IN THE DUMP AS WELL. ARE PLANS BEING MADE TO REMOVE DICHLOROETHYLENE AS WELL?

EPA RESPONSE: YES, THERE IS DICHLOROETHYLENE AT THE HIPPS ROAD LANDFILL. THIS CONTAMINANT IS FOUND IN THE SAME LOCATIONS AS THE VINYL CHLORIDE. ALSO DETECTED WITH THE VINYL CHLORIDE IS 1,2 DICHLOROETHYLENE WHICH IS NOT AS TOXIC AS VINYL CHLORIDE. THE AIR STRIPPING PROCESS WILL REMOVE THE DICHLOROETHYLENE AS WELL AS THE VINYL CHLORIDE. THE AREA THAT HAS BEEN IDENTIFIED AS THE PLUME OF CONTAMINATED GROUND WATER IS THE AREA THAT ALSO HAS THE DICHLOROETHYLENE CONTAMINATION. HOWEVER, IT SHOULD BE NOTED THAT THE DICHLOROETHYLENE LEVELS DETECTED ARE ALREADY BELOW THE LEVELS THAT ARE PROTECTIVE OF HUMAN HEALTH.

8. IS THERE IS A POSSIBILITY THAT SOME OF THE VINYL CHLORIDE COULD GO INTO THE ORTEGA RIVER?

EPA RESPONSE: THE SITE-RELATED CONTAMINANTS, IF LEFT UNTREATED AND NOT REMOVED FROM THE GROUND WATER, WOULD EVENTUALLY GO INTO THE ORTEGA RIVER.

ONE OF THE GOALS OF THE REMEDIAL INVESTIGATION FOR THE SITE WAS TO PROJECT WHAT KIND OF CONCENTRATIONS MIGHT RESULT IN THE ORTEGA RIVER IF THESE CONTAMINANTS WERE TO MOVE UNIMPEDED TOWARD THE WATERWAY. THE STUDY TOOK INTO ACCOUNT RATE OF GROUNDWATER FLOW AND AMOUNT OF DISPERSION. THE RESULTS INDICATED THAT THERE WOULD BE NO ADVERSE IMPACT ON THE AQUATIC LIFE IN THE RIVER. THE STUDY FURTHER CONCLUDED, THAT AT THE LEVELS THE CONTAMINANTS WERE DETECTED, THE PUBLIC HEALTH WOULD NOT BE AT RISK.

9. WHY DO THE TREES APPEAR TO BE DYING ON THE SITE?

EPA RESPONSE: THERE IS NO REASON TO BELIEVE THAT CONTAMINATION IS THE CAUSE OF TREES DYING ON THE SITE. WHEN A MAJOR CONSTRUCTION PROJECT IS UNDERTAKEN, THE WATER FLOW IN THE AREA CAN BE SIGNIFICANTLY ALTERED.THE CONSTRUCTION PROCESS MAY DISTURB AND EVEN KILL ROOTS AND VEGETATION.

WATER TREATMENT ISSUES

10. IS THE REASON THE CITY OF JACKSONVILLE REFUSES TO EXCEPT THE RECOVERED GROUND WATER IS BECAUSE EPA CANNOT GUARANTEE THE CONCENTRATIONS OF CONTAMINATION THAT WOULD BE SENT TO THEM?

EPA ATTORNEY RESPONSE: WE HAVE BEEN IN DISCUSSION WITH THE CITY OF JACKSONVILLE FOR SOME TIME CONCERNING TAKING CONTAMINATED WATERS FROM A SUPERFUND SITE.

THIS IS ALSO AN ISSUE IN OTHER SUPERFUND SITES WHERE THE REMEDIES THAT WERE SELECTED IN RECORDS OF DECISION CALLED FOR TREATMENT AND DISPOSAL AT MUNICIPAL TREATMENT PLANTS. THE CITY OF JACKSONVILLE IN OUR DISCUSSIONS HAD NEVER REFUSED TO TAKE THE WATER. HOWEVER, CITY OFFICIALS HAVE EXPRESSED CONCERNS REGARDING WHETHER OR NOT THE CITY WOULD BE ASSUMING LIABILITY BY ACCEPTING DISCHARGE FROM THE HIPPS ROAD LANDFILL SITE. IN ADDITION, THE CITY WAS CONCERNED THAT THE TREATMENT PLANT (POTW) MIGHT VIOLATE ITS NPDES PERMIT. THERE WAS NEVER A DECISION MADE OR A CONCLUSION REACHED THAT THEY WOULD NOT TAKE THE WATER. BECAUSE OF ESCALATING POTW COSTS, THE REMEDY SELECTED IN THE 1986 RECORD OF DECISION COULD NOW COST $3.9 TO $4.4 MILLION. THE ON-SITE TREATMENT, WHILE EQUALLY PROTECTIVE OF HUMAN HEALTH AND THE ENVIRONMENT, IS ESTIMATED AT $1.2 MILLION (FEBRUARY, 1990 ESTIMATE) AND IS, THEREFORE LESS EXPENSIVE.

11. THE CONTAMINATED GROUND WATER HAS ALREADY BEEN DETERMINED TO BE TOO TOXIC TO GO THROUGH THE JACKSONVILLE SEWAGE SYSTEM.

EPA RESPONSE: IN AN EFFORT TO EVALUATE THE TOXICITY OF THE GROUND WATER, EPA CONDUCTED TOXICITY TESTS THE WEEK OF FEBRUARY 14 - 19, 1990, ON WATER COLLECTED FROM WELLS TMW-7I AND TMW-7S IN AN AREA NORTHEAST OF THE HIPPS ROAD LANDFILL SITE. THESE WELLS APPEAR TO BE IN THE MOST CONTAMINATED PORTION OF THE PLUME FOR VOLATILE ORGANICS. THEY WERE SELECTED IN AN EFFORT TO GENERATE THE WORST CASE SITUATION. BASED ON EPA'S REVIEW OF THE TOXICITY TEST RESULTS, IT IS FELT THAT THE RESULTS SHOW THAT DISCHARGE TO THE POTW WOULD NOT CONTRIBUTE TO TOXICITY TO THE POTW'S WASTE STREAM INFLUENT. (REF: EPA CORRESPONDENCE TO WASTEWATER DIVISION. JACKSONVILLE PUBLIC UTILITIES DEPARTMENT, APRIL 17. 1990 RE: GROUNDWATER TOXICITY EVALUATION. HIPPS ROAD LANDFILL SITE.) THE STUDY FURTHER CONCLUDED THAT AT THE LEVELS THE CONTAMINANTS WERE DETECTED, THE PUBLIC HEALTH WOULD NOT BE AT RISK.

WELL PERMITTING/WELL CONSTRUCTION ISSUES

12. ADMINISTRATIVE RECORD DOCUMENTS INDICATE THAT TEST RESULTS FROM WELL DEPTHS OF 50 TO 60 FEET WERE DISALLOWED OR THROWN OUT. WHY WAS THIS DONE? ALSO, IS THERE A CURRENT DOCUMENT OR MODEL THAT INCORPORATES THESE EARLIER RESULTS IN ITS FINDINGS/CONCLUSIONS?

EPA RESPONSES NO, EARLIER RESULTS WERE NOT INCORPORATED. THE REASON IS THAT OF ALL THE WELLS THAT WERE CONSTRUCTED IN THE PAST, AN EVALUATION OF THE QUALITY OF THE WELL IN TERMS OF ITS ABILITY TO PROVIDE UNBIASED RESULTS WAS MADE. BASED ON THAT EVALUATION, WELLS THAT HAD BEEN INSTALLED BY THE EPA BACK IN 1985, 1986 WERE THE ONLY WELLS THAT WERE CONSIDERED UNBIASED FOR PRODUCING QUALITY RESULTS. WE INSTALLED WHAT WE CONSIDERED HIGH QUALITY WELLS, TO AS GOOD A STANDARD AS THERE IS IN THE INDUSTRY NOW TO BASICALLY REPLACE ALL OF THE WELLS THAT HAVE BEEN USED PREVIOUSLY. THAT IS ESSENTIALLY THE REASON THE EARLIER DATA FROM THE PREVIOUSLY CONSTRUCTED WELLS WEREN'T USED. TO ANSWER THE QUESTION CONCERNING EARLIER SAMPLING ANALYSES BEING THROWN OUT OF CURRENT STUDIES, WE SHOULD STATE THAT THE RESULTS WEREN'T REALLY THROWN OUT.

EARLIER RESULTS ARE NOT IN CURRENT REPORTS PRIMARILY BECAUSE WE'RE LOOKING FOR THE CURRENT LOCATION OF THE PLUME. TO HAVE DATA FROM SIX OR SEVEN YEARS AGO WOULD NOT BE HELPFUL FOR COMING UP WITH THE DESIGN.

13. ARE THERE PLANS TO CONSTRUCT WELLS NORTHEAST OF THE SITE TO DETERMINE WHERE THE CONTAMINATION PLUME IS AT THE PRESENT TIME?

EPA RESPONSE: FROM THE DATA COLLECTED FROM THE EXISTING WELL NETWORK WE HAVE DETERMINED WHERE THE PLUME OF CONTAMINATED GROUND WATER IS AT THE PRESENT TIME. FROM THE PROPOSED RECOVERY SYSTEM MONITORING WELLS AND THE RECOVERY WELL NETWORK, WE CAN FURTHER CONFIRM THE LOCATION OF THE CONTAMINATION PLUME.

14. WHAT INFORMATION DID THE NEWER WELLS, THE WELLS CONSTRUCTED ACCORDING TO YOUR SPECIFICATIONS YIELD THAT WAS DIFFERENT FROM THE PREVIOUS RESULTS?

EPA RESPONSE: THE NEWER WELLS WERE DESIGNED AND CONSTRUCTED SPECIFICALLY FOR ENVIRONMENTAL MONITORING. IN THIS WAY THE POSSIBILITY OF CAUSING BIAS IN THE SAMPLE ANALYTICAL RESULTS IS MINIMIZED. THE RESULTS OF SAMPLE ANALYSIS FROM THE NEWER WELLS WERE CONSISTENT WITH EARLIER SAMPLE RESULTS. THIS TENDED TO CONFIRM AND BETTER DETAIL OUR PREVIOUS UNDERSTANDING OF THE NATURE AND EXTENT OF CONTAMINATION. IN THIS WAY WE ALSO HAVE INDEPENDENT SUPPORT OF THE DATA FROM EARLIER AND LESS IDEALLY CONSTRUCTED WELLS. THUS WE CAN MORE CONFIDENTLY FACTOR EARLIER SAMPLING RESULTS INTO OUR REMEDY DECISION-MAKING PROCESS.

15. HOW DEEP IS THE DEEPEST WELL THAT IS CONTAMINATED?

EPA RESPONSE: APPROXIMATELY 57 TO 60 FEET.

16. WHY IS THE CITY OF JACKSONVILLE STILL ALLOWING PERMITS FOR WELLS TO BE DUG? WHO IS RESPONSIBLE FOR WELL PERMITTING IN JACKSONVILLE?

EPA RESPONSE: THE EPA HAS HAD DISCUSSIONS WITH JACKSONVILLE BIO-ENVIRONMENTAL SERVICES REGARDING THE WELL PERMIT PROGRAM. THE CITY RECOGNIZES THAT IT NEEDS IMPROVED REGULATIONS TO BE ABLE TO BETTER CONTROL INSTALLATION OF WELLS IN CONTAMINATED AREAS. THE AGENCY HAS ALSO REFERRED THE CITY TO DADE COUNTY OFFICIALS, WHO HAVE BEEN DEALING WITH THIS TYPE OF PROBLEM FOR SEVERAL YEARS.

WELL PERMITS ARE HANDLED THROUGH THE CITY OF JACKSONVILLE'S DEPARTMENT OF HEALTH, WELFARE, AND BIOENVIRONMENTAL SERVICES. THEIR ADDRESS IS:

421 W. CHURCH STREET
JACKSONVILLE, FLORIDA 32202-4111
(904) 630-3666
MR. GARY V. WEISE - MANAGER

17. HOW WILL THE PUMPING OF LARGE VOLUMES OF CONTAMINATED WATER EFFECT THE NEIGHBORING WELLS?

EPA RESPONSE: THE AREA IN WHICH WE ARE GOING TO BE PUMPING WILL CAUSE SOME DRAWDOWN RIGHT AROUND THE WELLS THAT WE PUMP. WE DID A PUMPING TEST, AND AS PART OF THE TEST, WE PUMPED A TEST WELL AT ABOUT 60 GALLONS PER MINUTE. THE DRAWDOWN FROM THE TEST WAS MINIMAL. THE EXTRACTION WELLS WE ARE INSTALLING WILL PUMP AT ABOUT 40 GALLONS PER MINUTE, SO THE EFFECT OF PUMPING WILL BE SOMEWHAT LESS. IN THE IMMEDIATE VICINITY THERE WILL BE DRAWDOWN. THERE IS NOT ANYONE USING WELLS IN THE AREA OF CONTAMINATION. IN A RADIUS OF 50 FEET TO 100 FEET AWAY FROM A PARTICULAR WELL, THE DRAWDOWN WILL BE ESSENTIALLY MINIMAL; IT WILL BE ON THE ORDER OF A FOOT OR A COUPLE OF FEET.

<u>GROUNDWATER TREATMENT SYSTEM</u>

18. HOW LONG WILL THE AIR STRIPPER BE OPERATED?

EPA RESPONSE: THE AIR STRIPPER WILL BE OPERATED UNTIL THE CLEANUP GOALS IN THE AQUIFER ARE MET. THE PROCESS COULD TAKE ONE TO THREE YEARS.

19. HOW OFTEN WILL TESTING OF CONTAMINANTS BE DONE ON THE GROUNDWATER TREATMENT SYSTEM?

EPA REPRESENTATIVE RESPONSE: THE FIRST PHASE OF THE SYSTEM IS A TREATABILITY STUDY, WHICH IS A PERIOD OF TIME WHEN THE SYSTEM IS TESTED FOR EFFECTIVENESS. DURING THE STUDY, THE RATIOS OF AIR TO WATER ARE ADJUSTED TO INSURE THAT THE SYSTEM IS PERFORMING PROPERLY. DURING THAT TIME, TESTING WILL BE QUITE REGULAR, PROBABLY AT LEAST ON A DAILY BASIS IF NOT MORE OFTEN. AS THE PERFORMANCE OF THE SYSTEM IS AT THE LEVEL IT SHOULD BE, THE TESTING WILL BE DONE QUARTERLY. THE WATER THAT WILL BE DISCHARGED FROM THE TREATMENT SYSTEM WILL MEET DRINKING WATER STANDARDS.

20. WILL INSTITUTIONAL CONTROLS ASSOCIATED WITH THE REMEDIAL ACTION INCLUDE AN INVESTIGATION OF RESIDENTS NOT HOOKED UP TO CITY WATER WITHIN THE AREA OF THE GROUNDWATER CONTAMINATION PLUME?

EPA REPRESENTATIVE RESPONSE: A REVIEW OF THE LOCATION OF THE CITY WATER LINES RELATIVE TO THE AREA OF OFF-SITE CONTAMINATION HAS BEEN CONDUCTED (AUGUST, 1990). THE REVIEW LEAD TO THE CONCLUSION THAT ALL RESIDENCES WITHIN THE AREA OF OFF-SITE CONTAMINATION ARE CURRENTLY CONNECTED TO THE MUNICIPAL WATER SUPPLY.

21. WHAT EFFECT WILL A RAINY SEASON HAVE ON RECOVERY EFFORTS?

EPA REPRESENTATIVE RESPONSE: A RAINY SEASON WILL LIKELY DILUTE THE CONTAMINANT PLUME SOMEWHAT AND EXTEND RECOVERY EFFORTS. THE SIZE OF THE RECOVERY SYSTEM AND THE CORRESPONDING TREATMENT SYSTEM ARE BELIEVED ADEQUATE TO ACCOMMODATE A WETTER THAN NORMAL SEASON. IT SHOULD HAVE NO SIGNIFICANT EFFECT ON THE STORMWATER RETENTION BASIN'S ABILITY TO HANDLE THE QUANTITIES OF WATER NECESSARY.

REMAINING CONCERNS

THE COMMUNITY'S CONCERNS SURROUNDING THE HIPPS ROAD LANDFILL SITE WILL BE ADDRESSED IN THE FOLLOWING AREAS: COMMUNITY RELATIONS SUPPORT THROUGHOUT THE REMEDIAL DESIGN/REMEDIAL ACTION, AND INCORPORATION OF COMMENTS/SUGGESTIONS IN THE REMEDIAL DESIGN.

COMMUNITY RELATIONS SHOULD CONSIST OF MAKING AVAILABLE FINAL DOCUMENTS (I.E. REMEDIAL ACTION PROGRESS REPORTS, MONITORING DATA, ETC.) IN A TIMELY MANNER TO THE LOCAL REPOSITORY. ALSO, ISSUANCE OF FACT SHEETS TO THOSE ON THE MAILING LIST WILL FURTHER PROVIDE THE COMMUNITY WITH PROJECT PROGRESS AND A SCHEDULE OF EVENTS. THE COMMUNITY WILL BE MADE AWARE OF ANY PRINCIPAL DESIGN CHANGES MADE DURING THE PROJECT DESIGN. IF AT ANY TIME DURING THE REMEDIAL ACTION NEW INFORMATION IS REVEALED THAT COULD AFFECT THE IMPLEMENTATION OF THE REMEDY OR IF THE REMEDY FAILS TO ACHIEVE THE NECESSARY DESIGN CRITERIA, THE RECORD OF DECISION MAY BE REVISED TO INCORPORATE NEW TECHNOLOGY THAT WILL ATTAIN THE NECESSARY PERFORMANCE CRITERIA.

COMMUNITY RELATIONS ACTIVITIES WILL REMAIN AN ACTIVE ASPECT OF THE REMEDIAL ACTION PHASE OF THIS PROJECT.

#TA

TABLE 1

GROUNDWATER REMEDIATION GOALS

CHEMICAL	REMEDIATION GOAL (UG/L)	BASIS
BENZENE	1	PDWS
BIS (2-ETHYLHEXYL) PHTHALATE	4	PMCL
CHLOROBENZENE	100	PMCL
CHROMIUM(*)	50	MCL
1,4-DICHLOROBENZENE	75	PDWS
TRANS-1-2-DICHLOROETHYLENE	100	PMCL
ETHYL BENZENE	700	PMCL
LEAD(*)	15	RCG
NAPHTHALENE	140	RFD
VINYL CHLORIDE	1	PDWS

PDWS - STATE OF FLORIDA PRIMARY DRINKING WATER STANDARD

PMCL - PROPOSED MAXIMUM CONTAMINANT LEVEL

RCG - RECOMMENDED CLEANUP GOAL FOR LEAD AT SUPERFUND SITES (CORRESPONDENCE FROM THE DIRECTORS OF OFFICE OF EMERGENCY & REMEDIAL RESPONSE AND OFFICE OF WASTE PROGRAMS ENFORCEMENT, JUNE 21, 1990)

MCL - MAXIMUM CONTAMINANT LEVEL

RFD - REFERENCE DOSE. THIS IS THE SYSTEMIC THRESHOLD CONCENTRATION CALCULATED AS RFD (MG/KG-DAY) X BODY WEIGHT (70 KG)/DAILY WATER CONSUMPTION (2 LITERS). THE RFD FOR NAPHTHALENE IS 4E-3 (HEALTH EFFECTS SUMMARY TABLES 3RD QUARTER, FY90)

* LEAD AND CHROMIUM ARE NOT CONSIDERED SITE-RELATED AND WILL NOT BE THE TARGET OF GROUNDWATER RECOVERY. HOWEVER, METALS CONCENTRATIONS IN RECOVERED GROUND WATER WILL BE REDUCED TO MCLS BEFORE THE GROUND WATER IS DISCHARGED TO THE RETENTION BASIN.

TABLE 2

SUMMARY TABLE OF FEASIBLE ALTERNATIVES AND COST-EFFECTIVENESS COMPARISON.COST IN MILLIONS OF DOLLARS.

REMEDIAL ALTERNATIVE	REASON FOR NON-SELECTION	ESTIMATED COST RANGE
A-1. AIR STRIPPING, DISPOSAL ON-SITE	LESS COST EFFECTIVE THAN TREATMENT AT THE POTW AND FAILURE TO ADDRESS ALL GROUND WATER CONTAMINANTS	1.6 TO 3.3
A-2. EXTRACTION, FLOCCULATION, SEDIMENTATION, FILTRATION AND DISPOSAL TO THE ORTEGA RIVER	LESS COST-EFFECTIVE THAN TREATMENT AT THE POTW AND FAILS TO ADDRESS ALL GROUNDWATER CONTAMINANTS	1.3 TO 1.8
A-3. EXTRACTION & TREATMENT AT THE POTW	THE RECOMMENDED ALTERNATIVE FOR GROUND WATER REMEDIATION	1.3 TO 1.9
A-4. EXTRACTION, AIR-STRIPPING, FLOCCULATION, FILTRATION, CARBON ADSORPTION, & DISPOSAL TO THE ORTEGA RIVER	ADDRESSES ALL GROUNDWATER CONTAMINANTS, BUT IS EXPENSIVE COMPARED TO TREATMENT AT POTW	3.1 TO 4.0
A-5. EXTRACTION FROM HYDRAULIC BARRIER WELLS, LONG TERM AIR STRIPPING, AND DISPOSAL TO THE POTW	LESS COST-EFFECTIVE THAN TREATMENT AT THE POTW AND FAILS TO ADDRESS ALL GROUND WATER CONTAMINANTS	9.0 TO 10.6
A-6. EXTRACTION FROM HYDRAULIC BARRIER WELLS, ON-SITE TREATMENT ACCORDING TO A-4, AND DISCHARGE TO THE POTW	LESS COST-EFFECTIVE THAN TREATMENT AT THE POTW AND FAILS TO ADDRESS ALL GROUND WATER CONTAMINANTS	3.2 TO 17.3
A-7. INSTALLATION OF HANGING SLURRY WALL, SURFACE CAPPING, REVERSE GRADIENT WELLS WITHIN THE SLURRY WALL AND DISCHARGE TO POTW	EXPENSIVE, CONTAINMENT ONLY; DOES NOT RESTORE AQUIFER	4.1 TO 6.9